

WHAT IS CLAIMED IS:

1. A superconducting circuit comprising:
a single flux quantum circuit using a high
temperature superconductor; and
an interface circuit for said single flux quantum
circuit,

wherein said single flux quantum circuit is
provided with a first Josephson junction, and said
interface circuit is provided with a second Josephson
junction made from a combination of materials
different from those of said first Josephson junction,
and

wherein hysteresis in the current-voltage
characteristic of said first Josephson junction is
smaller than hysteresis in the current-voltage
characteristic of said second Josephson junction.

2. The superconducting circuit according to
claim 1, wherein said interface circuit is formed of
a latch driver circuit.

3. The superconducting circuit according to
claim 1, wherein a junction in which hysteresis in
the current-voltage characteristic is 10 % or less is
used for said first Josephson junction and a junction
in which hysteresis in the current-voltage
characteristic is 10% or more is used for said second
Josephson junction.

4. The superconducting circuit according to
claim 2, wherein a junction in which hysteresis in

the current-voltage characteristic is 10 % or less is used for said first Josephson junction and a junction in which hysteresis in the current-voltage characteristic is 10% or more is used for said second Josephson junction.

5. The superconducting circuit according to claim 1, wherein said first Josephson junction and said second Josephson junction are each formed by a ramp edge junction.

6. The superconducting circuit according to claim 2, wherein said first Josephson junction and said second Josephson junction are each formed by a ramp edge junction.

7. The superconducting circuit according to claim 3, wherein said first Josephson junction and said second Josephson junction are each formed by a ramp edge junction.

8. The superconducting circuit according to claim 1,

wherein said first Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from YbBaCuO; and
a damage layer formed between the lower electrode and the upper electrode, serving as a barrier, and
wherein said second Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;
and

a layer made from LaSrAlTaO in addition to a damage layer formed between the lower electrode and the upper electrode, serving as a barrier.

9. The superconducting circuit according to claim 2,

wherein said first Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from YbBaCuO; and
a damage layer formed between the lower electrode and the upper electrode, serving as a barrier, and
wherein said second Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;
and

a layer made from LaSrAlTaO in addition to a damage layer formed between the lower electrode and the upper electrode, serving as a barrier.

10. The superconducting circuit according to claim 3,

wherein said first Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from YbBaCuO; and
a damage layer formed between the lower electrode and the upper electrode, serving as a barrier, and
wherein said second Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;
and

a layer made from LaSrAlTaO in addition to a damage layer formed between the lower electrode and the upper electrode, serving as a barrier.

11. The superconducting circuit according to claim 1,

wherein said first Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;

and

a damage layer formed between the lower electrode and the upper electrode, serving as a barrier, and

wherein said second Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;

and

a layer made from LaSrAlTaO in addition to a damage layer formed between the lower electrode and the upper electrode, serving as a barrier.

12. The superconducting circuit according to claim 2,

wherein said first Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;

and

a damage layer formed between the lower electrode and the upper electrode, serving as a barrier, and

wherein said second Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;

an upper electrode made from La-doped YbBaCuO;
and

a layer made from LaSrAlTaO in addition to a damage layer formed between the lower electrode and the upper electrode, serving as a barrier.

13. The superconducting circuit according to claim 3,

wherein said first Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;
and

a damage layer formed between the lower electrode and the upper electrode, serving as a barrier, and

wherein said second Josephson junction comprises:
a lower electrode made from La-doped YBaCuO;
an upper electrode made from La-doped YbBaCuO;
and

a layer made from LaSrAlTaO in addition to a damage layer formed between the lower electrode and the upper electrode, serving as a barrier.

14. The superconducting circuit according to claim 1, wherein said single flux quantum circuit is provided with a ground plane made from La-doped YBaCuO to restrain inductance in the single flux quantum circuit.

15. The superconducting circuit according to claim 2, wherein said single flux quantum circuit is provided with a ground plane made from La-doped

YBaCuO to restrain inductance in the single flux quantum circuit.

16. The superconducting circuit according to claim 3, wherein said single flux quantum circuit is provided with a ground plane made from La-doped YBaCuO to restrain inductance in the single flux quantum circuit.

17. The superconducting circuit according to claim 1, wherein said single flux quantum circuit and said interface circuit are structured to be a multi-chip module.